Letters to the Editor

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X-RAY ANALYSIS OF RADIOACTIVE FALLOUT OVER CALCUTTA

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Since 1961, the radioactive fallout over Calcutta has been systematically collected and studied in our laboratory. The samples were generally classified

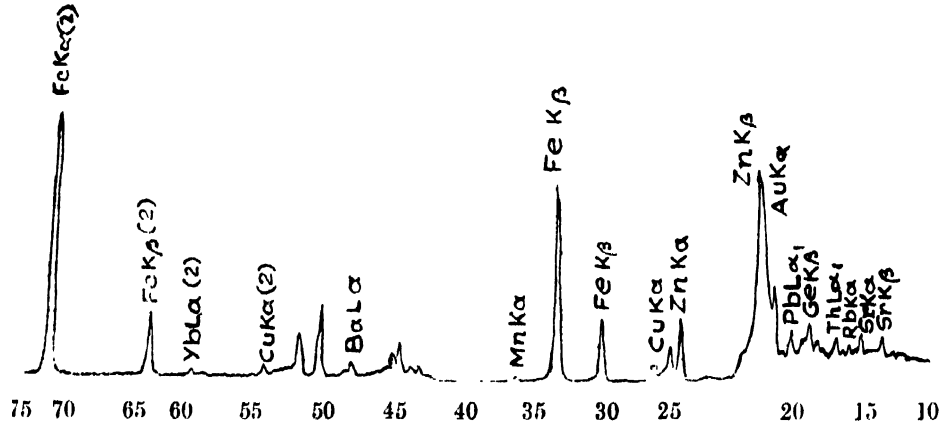

Fig. 1. X-ray Spectrum of Sample—A, at 36Kv, 24mA.

Scale factor — ×8 between 9° to 24°

×64 between 24° to 43°

×8 between 43° to 75°

2θ Scans. Time constant—4.

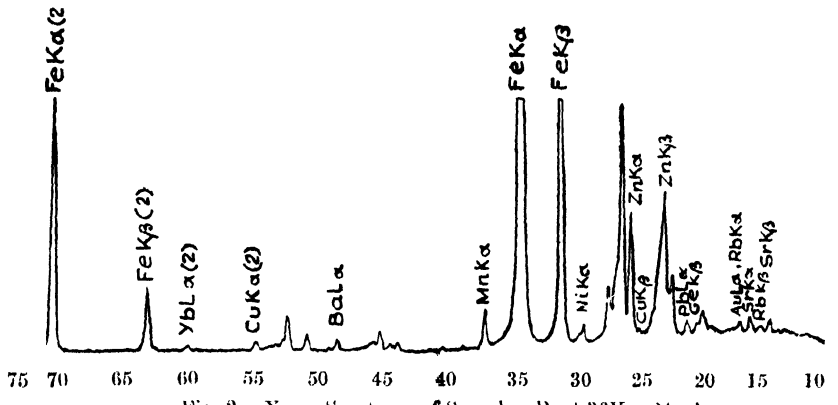

Fig. 2. X-ray Spectrum of Sample—B, at 36Kv, 24mA.

Scale factor :— × 8 between 10° to 75°

2θ Scan. Time constant—4.

into three groups. The first Group 1 (sample A) consisted of air-borne particles deposited in an enamelled tray smeared with glycerine, on dry rainless days. During rainy days, however, the rainborne dust was collected along with rain-water in an empty tray. The water was filtered, the insoluble residue forming the material for Group 2 (Sample B). The filtrate was finally evaporated to dryness, yielding working material for Group 3 (sample C). The samples were separately powdered in an agate mortar and pressed into pills of appro priate sizes.

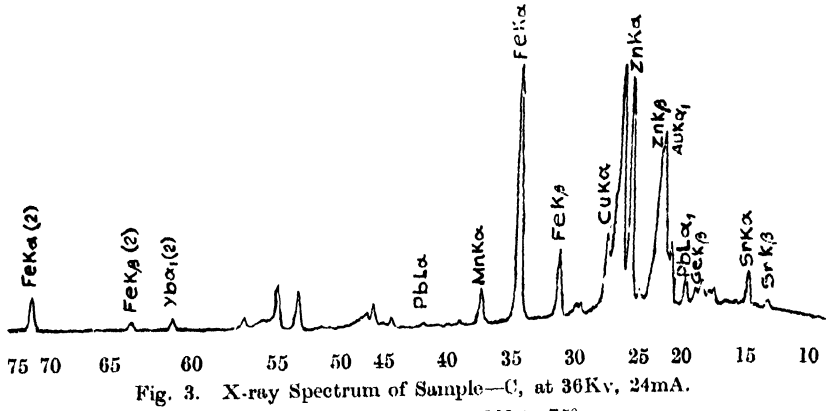

Fig. 3. X-ray Spectrum of Sample—C, at 36Kv, 24mA.

Scale factor :— × 8 between 10° to 75°

2θ Scan. Time constant—4.

The X-ray spectrographic analyses were carried out with a plane crystal quartz X-ray spectograph whose analytical range extends from Ti (At. No. 22) upwards. An appropriate idea of the distribution of the heavy and light elements was obtained by varying the high tension applied to the X-ray tube. The X-ray

spectra of the samples A, B, and C, so obtained, were compared with standard curves of the following elements, Ni, Cu, Fe, Mn, Bi and Au, under the same parametric conditions for 2Θ calibration. To detect the presence of recognisable quantities of Uranium, all the spectra were compared to the spectrum of a uraninite mineral sample.

The graphs A, B and C represent the spectra of the respective group samples taken at 36KV and 24MA. The spectra have been crosschecked in every case with those taken at 20 KV, 24MA. The elements identified are tabulated sample-wise in Table I.

It may be noted that Pb and W peaks are present in all the graphs. Presumably the W lines owe their origin to the W^{181} of Hardtack test or scatterings of the incident beam, while the Pb lines could also be due to the presence of lead lining of the sample holder.

TABLE I

Sample A : dry fallout	Zn, Fe, Cu, Th, Mn, Ni, Au, Bi, Rb, Sr, Yb, Ba.
Sample B : Residue from rain-borne fallout.	Zn, Fe, Cu, Mn, Sr, Ni, Au, Bi, Rb, Ba, Yb.
Sample C : Water soluble salts from rainborne fall-out.	Zn, Fe, Cu, Sr, Ni, Mn, Bi, Au, Yb.

In sample 'A' (dry fallout), Zn, Cu, Fe, and Sn are present in much greater quantities than in sample 'B', filtered as rain-borne fall-out. Th is present only in sample A. It may be noted that Zn predominates as a water soluble salt, while Ba and Fe predominate in insoluble form. The presence of large quantities of Fe, Zn and Mn have also been corroborated by chemical analysis.

We are indebted to Prof. S. D. Chatterjee for his active interest and guidance in the work.